

“Great inventions are never, and great discoveries are seldom the work of any one mind. Every great invention is really an aggregation of minor inventions, or the final step of a progression. It is not a creation but a growth - as truly so as that of the trees in the forest.”

Robert H. Thurston



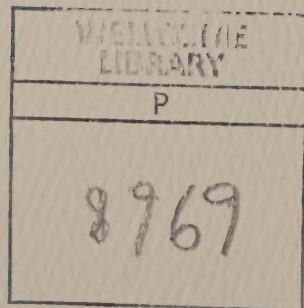
INNOVATION
IN
ACTION



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AIDE MEMOIRE



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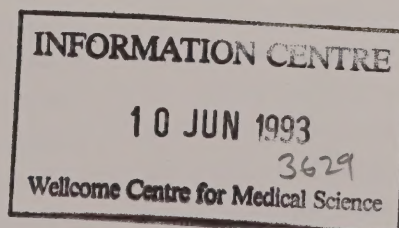
MINISTERIAL FOREWORD

Government's research and development strategy for Northern Ireland "Innovation 2000" placed continuous creativity and technology transfer in the vanguard of our overall economic development effort. In particular, it emphasised the importance of communication and co-operation between industry, academia and Government. This booklet "Innovation in Action" shows what can be achieved when such collective effort is applied to a common purpose - increasing the competitiveness of Northern Ireland industry through sustained technological and managerial change. These inspiring local examples merit emulation and the succinct "aide memoire" on innovation should help to sharpen management focus on the total approach required to turn promising prototypes into profitable products - to put innovation into action. I commend this booklet to all managers in Northern Ireland. I hope that its selective examples both stimulate many others and complement the crucial work of the Industrial Research and Technology Unit and its Board.

Robert Atkins
*Minister for the Economy
and the Environment*
June 1992



**"These inspiring
local examples
merit emulation..."**



Example is more compelling than precept, and local example of best practice is a potent stimulus and inspiration. This is particularly so in the field of innovation and increased competitiveness. This booklet introduces the Chairman and Members of the Board of the new Industrial Research and Technology Unit (IRTU) and provides selected examples of successful innovation in Northern Ireland.

Since its launch in March 1992 the new IRTU has published both a research and development strategy for Northern Ireland - appropriately entitled "Innovation 2000" - and a synopsis of the extensive range of services provided - the booklet "Sharpening the Competitive Edge". The new Unit has also initiated a continuing promotional programme placing particular emphasis on the management of innovation.

Developing the successful management of innovation by industry is at the heart of Government's research and development strategy. The IRTU provides "single door" access to over £50m worth of support funding over the next three years. That support, though variously channelled and applied, has a single focus. Its basic purpose is to sharpen the competitiveness of Northern Ireland industry by increasing the appreciation, application and best practice of continuous innovation by local management.

The examples in this booklet prove that, regardless of size or industrial sector, Northern Ireland's managers can respond to the challenge. Successful innovation can be -

and is now - a feature of Northern Ireland industry. The first and most important steps can be taken by all because they are attitudinal. They involve the:-

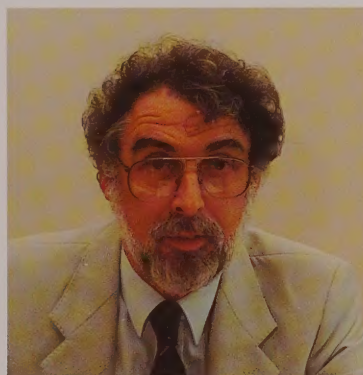
- acceptance of change as the only constant;
- appreciation that technological change is quick and cuts deep; it rapidly affects not only consumer preferences, markets and product, but also business management, training and - crucially - personnel;
- adaptation to the reality of global competition;
- anticipation of market challenges; and
- ability to recognise the potential opportunities in such challenges and/or the need for early diversification to sustain business advantage.

So the succinct case studies in this booklet are intended as templates on which others can base similarly positive attitudes and successful practice. This is important, because there are no grounds for complacency. Sustained work is needed to make innovation a cornerstone of Northern Ireland management. That is why this booklet is being distributed widely throughout industry, commerce and academia. Such extensive circulation helps to address some of the key functions of the new IRTU by disseminating information on best innovation practice, encouraging replication, and promoting closer collaboration between industry, academia and Government.

CHAIRMAN'S STATEMENT

“...much has already been achieved in Northern Ireland through collaboration and collective effort.”

The Board of the new Industrial Research and Technology Unit has an exciting task to address. Building on the momentum of the former Technology Board for Northern Ireland, it will aim to increase the impetus of innovation throughout Northern Ireland industry and commerce. In doing so it will have particular regard to the contribution which technological research and development can make to sharpening our economic competitiveness. I look forward with anticipation to chairing the Board and, in particular, look to the Board to help to forge closer links between industry, Government and academia. As the case studies in this booklet indicate, much has already been achieved in Northern Ireland through collaboration and collective effort. We look forward to continuing success.



Professor Daniel V McCaughan
Chairman
*Board of the Industrial Research and
Technology Unit*

Continuous innovation is the central message of the R&D strategy for Northern Ireland. The Board of the Industrial Research and Technology Unit will have a key role in its delivery. Composed of prominent industrialists and academics, the Board's task will be to monitor the work of IRTU, supervise implementation of its Corporate Plan and effect closer liaison between industry, academia and Government. In particular the board will ensure that IRTU's programmes are relevant to the needs of business.

IRTU BOARD MEMBERS

CHAIRMAN

Professor Daniel V McCaughan, BSc, PhD
NITEC
Northern Telecom (NI) LTD.

DEPUTY CHAIRMAN

Mr Peter McKie
Du Pont (UK) Ltd

BOARD MEMBERS

Professor Eric K Beatty, MBE
NI Technology Centre

Mr Francis Graham
Kainos Software Ltd

Mrs Gillian Gracey
Ivex Pharmaceuticals Ltd

Ms Joan E Ruddock
EdCo Ltd

Mr James McCusker
Northern Ireland Public Service Alliance

Professor Fabian Monds
University of Ulster

Dr Tom Little
Unilever Research Colworth Laboratory

Mr Kenneth Atkins
ABM International Associates

Mr William H Morris
Short Brothers plc

Mr Jim Collins
Ford Motor Co Ltd

“consultancy help”

“IRTU technicians at the Industrial Science Centre deserve full credit for their contribution to this and a number of other major developments over the last decade.”

Mr Roy Henderson
*Technical Director
Abbicoil Springs.*



ABBICOIL SPRINGS

Abbicoil Springs, Portadown, created an innovative design for safety harness clips using spring steel wire. It was designed to provide an alternative to the well known Carabiner - widely used in marine leisure activities, in other sports and in industrial applications. IRTU carried out physical testing on some early prototypes which showed that although lighter than the competition, these clips had a higher tensile strength. IRTU Industrial Science Centre engineers were able to construct destruction facilities to identify where and how this excellent product could be improved further.

Mr Roy Henderson, Technical Director, said, “I was delighted to be awarded a Gold Medal at the 20th Exhibition of Design Techniques and Inventions held in Geneva. IRTU technicians at the Industrial Science Centre deserve full credit for their contribution to this and a number of other major developments over the last decade.”

When a local entrepreneur wanted to put his ideas for a range of cosmetic products into practice he approached IRTU's Industrial Science Centre for assistance in incorporating novel ingredients in a range of skin care products. Further advice on manufacturing techniques was provided. Nectar Beauty Shops has grown significantly since then with an expanding product range retailed through franchised outlets throughout the UK and worldwide.

Chairman, Mr Alan Nocher, said, "I recognise the value to my business of the early assistance provided by IRTU's Industrial Science Centre. I would recommend all local innovators to make early contact with IRTU for advice and assistance."



“I recognise the value to my business of the early assistance provided by IRTU’s Industrial Science Centre.”

Mr Alan Nocher
Chairman
Nectar Beauty Shops

NICHOLAS ELECTRONIC DESIGN

Marshalling wands are used to direct pilots of incoming aircraft from the taxiways to the apron parking areas. Nicholas Electronic Design, based at Belfast International Airport, has developed a new system using a high output light source driven by specifically designed electronics and a rechargeable battery. With grant aid from LEDU, IRTU's Industrial Science Centre was approached for help with the selection of bonding materials used in the casing. Further help was given in selecting the correct potting material to protect the electronic components and prevent ingress of hazardous gases. The company's range of portable aerodrome lighting, approved by the Civil Aviation Authority was also designed with technical help from IRTU.

Mr Bill Nicholas, who developed the system, said, "The wand has now been sold to many airport authorities in the UK and beyond. I valued IRTU's help in achieving this and hope with their support to develop the product even further."



**“I valued IRTU's help
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Mr Bill Nicholas
Nicholas Electronic Design

*“technology
transfer services”*

“...the IRTU Teaching Company Scheme should give us a significantly increased competitive edge as we seek to increase our export markets.”

ART GLASS

Art Glass is a small business producing decorative glass products in Londonderry. The company has used IRTU's Teaching Company Scheme to extend and develop design technology and procedures within the organisation. This has been achieved through the development of intelligent knowledge-based design systems and through increasing its expertise in computer graphics. As a result, close links have been formed with the University of Ulster's Institute of Informatics, particularly the Department of Information Systems located at the Magee College campus.

Managing Director of Art Glass, Mr Philip Coyle said, “The fact that the expertise of Magee College in computer aided design, image processing and intelligent knowledge-based systems is available to us through the IRTU Teaching Company Scheme should give us a significantly increased competitive edge as we seek to increase our export markets.”

Mr Philip Coyle
*Managing Director
Art Glass*





Mr Per Nielsen
*Managing Director
Harland and Wolff*

HARLAND AND WOLFF

Harland and Wolff has just begun its second Teaching Company partnership. The first, with the Department of Civil Engineering at the Queen's University of Belfast, ran for 4 years and had 4 associates working on accuracy control. The novel approach used resulted in the company reducing the amount of rework on ships. Mr Per Nielsen, Managing Director, was so impressed that he pressed for a further programme with the University of Ulster. The objectives were to implement modern management philosophy including full employee participation, to introduce to all levels of the workforce the Japanese incremental improvement philosophy KAIZEN and to work with Kawasaki on work techniques. A useful side effect of the programme is to improve the knowledge base of this concept within the University to the ultimate benefit of other Northern Ireland businesses.

Mr Nielsen said, "I could not praise the Teaching Company Scheme too highly for its role in establishing partnerships between business and education establishments. It has resulted in great strides forward in specific areas of our operation."

**"I could not
praise the
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education establishments."**

HOECHST FIBRE

At the heart of Hoechst Fibre's plans to improve quality and operational profitability is IRTU's Teaching Company Scheme. Hoechst, probably the biggest German business investment in Northern Ireland, produces continuous multifilament and monofilament textile yarns from polyester chip. It has employed the expertise of staff from the University of Ulster to work on projects designed to modernise processes and systems within the company. The result should be improvements in product quality and uniformity, in productivity and product range as well as in data handling and process control.

Hoechst's Works Director in Limavady, Mr Mike McVeigh, said that the scheme was a further manifestation of the excellent links between business and academia in Northern Ireland. He paid tribute to the quality and relevance of the work going on in the Department of Mechanical and Industrial Engineering at the University of Ulster and said, "We welcome the fact that IRTU through its strategy of improving the competitiveness of Northern Ireland industry is prepared to assist in further developing the already close links between the scientist and the industrialist."

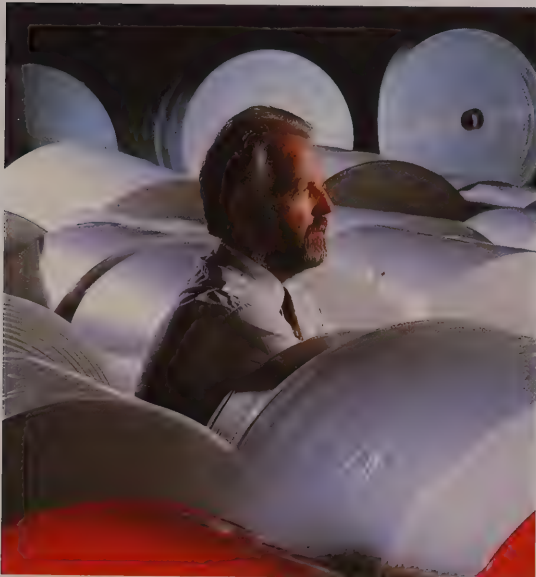


Mr Mike McVeigh
*Works Director
Hoechst Fibre*

“We welcome
the fact that
IRTU... is prepared to assist in
further developing the already
close links between the scientist
and the industrialist.”

“I am delighted with the facilities which have been made available to us through IRTU's Teaching Company Scheme.”

Mr Phillip Jordan
*Managing Director
Jordan Plastics*



JORDAN PLASTICS

Experts in the Department of Chemical Engineering at the Queen's University of Belfast are helping Jordan Plastics to improve quality and increase output from their polyethylene plant. The polyethylene film is manufactured for use in automated packaging equipment. As a result of research carried out both in Queen's and in the factory, Jordan is developing its products to the full, and satisfying the individual needs of their customers. In addition, the reproducibility of film has been improved by better process control of the blow extrusion lines. The modifications are resulting from the company's involvement in the Teaching Company Scheme. As part of the facilities on offer to Teaching Company participants the company had access to sophisticated laboratory equipment.

Managing Director, Mr Phillip Jordan, said, “I am delighted with the facilities which have been made available to us through IRTU's Teaching Company Scheme. The benefits to the Company will be better quality products and improved production. With the assistance of the two associates we have addressed environmental issues by an investigation into the recycling of transite packaging.”

“The technical information service, which IRTU supports... is of immense benefit to hundreds of businesses and entrepreneurs each year.”

Prof. Eric Beatty
Director
NITC

NITC

The Northern Ireland Technology Centre, based at the Queen's University of Belfast, is a practical experience centre dedicated to technology transfer. Its resources are used to provide industry with services ranging from problem solving to the research and development of new products and processes. Technical expertise extends from computer aided design to structural testing. IRTU provides financial support for the Centre's technical information services.

Professor Eric Beatty, the Director of the Centre, said, “We operate as a self-financing enterprise and our services have to be relevant to the needs of industry. The technical information service, which IRTU supports, is the entry point for most enquiries and is of immense benefit to hundreds of businesses and entrepreneurs each year.”



TYRONE CRYSTAL

Tyrone Crystal is one of Northern Ireland's home-grown success stories. Started in 1971 to provide jobs in a high unemployment blackspot, it is now a well recognised manufacturer of high quality full lead crystal. The company has been using IRTU's Teaching Company Scheme for some years now. As a result it has been able to develop a prototype furnace, which has proven so successful that it now forms a crucial part of the production process. Computer applications in the areas of stock control, sales order processing, accounting and management reports have been developed and implemented. Further work, again supported by IRTU, is planned to develop a fully integrated Production Planning and Control System and to develop the marketing of crystal abroad.



Mr Pat Killen
*Managing Director
Tyrone Crystal*

Managing Director, Mr Pat Killen, said, "IRTU's Teaching Company Scheme has produced live, relevant projects which have shown themselves to be integral to the company's development. I would not hesitate to recommend the scheme to other businesses."

"IRTU's Teaching Company Scheme has produced live, relevant projects which have shown themselves to be integral to the company's development."

“We were delighted with the work of the associate and she is now employed full-time as Business Development Manager.”

VALPAR

Using the Teaching Company Scheme to develop new export markets proved to be a wise use of resources for Valpar Limited. The company manufactures multi-core tubing for use in hotels and bars to deliver beverages from the cellars to the counter. The first associate has now completed her programme of work, in which she set up a distributorship in Australia and established a series of useful contacts in Hong Kong, Thailand, New Zealand and Japan.

Mr Robert Beckett, Managing Director, said, “By establishing a partnership with the University of Ulster's Department of Marketing under IRTU's Teaching Company Scheme, we have developed important new export markets for our product. We were delighted with the work of the associate and she is now employed full-time as Business Development Manager.”

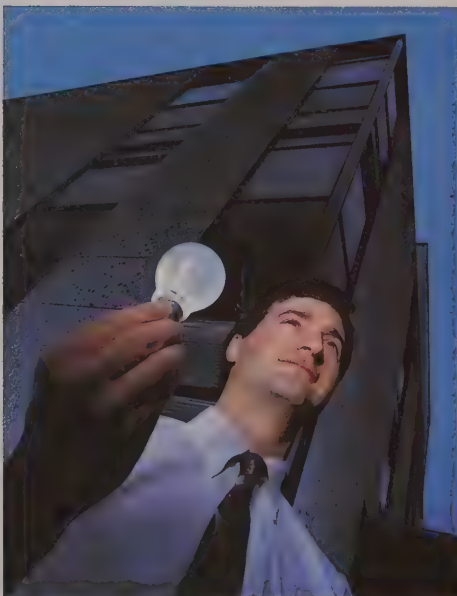
Mr Robert Beckett
Managing Director
Valpar



*“support for
research &
development”*

“The strength of SMART and of IRTU is that they can provide the assistance needed to carry an initial concept through to the pre-production prototype.”

Mr Hugh Cormican
*Managing Director
Andor Technology*



ANDOR TECHNOLOGY

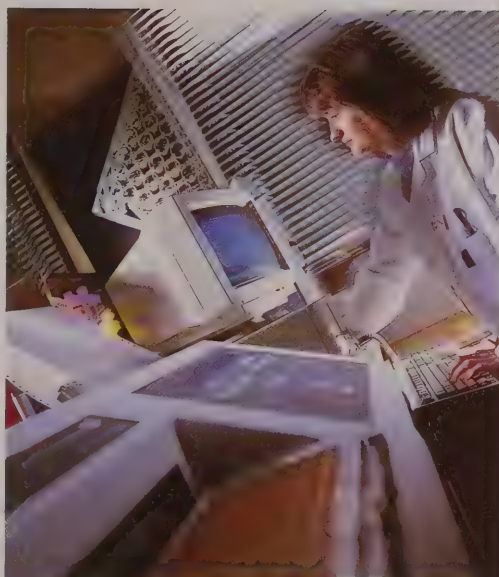
Andor Technology develops and manufactures sophisticated equipment for the scientific and industrial market. The company was formed from staff of the Queen's University and the University of Ulster with skills in computing, electronics, optics and lasers. Andor entered the SMART competition in 1990, moving on to the second stage in 1991. The development for which they sought support was a spectral analyser which though built to a high specification was of small size and portable. They were successful, and are now developing the analyser beyond the prototype stage to that of a well designed product. The company is looking closely at how the product will be marketed across the world, an indication of the confidence they have in its prospects.

Mr Hugh Cormican, Managing Director, said, “Through the SMART competition we are producing a piece of equipment which is technologically much more advanced than anything currently available. The strength of SMART and of IRTU is that they can provide the assistance needed to carry an initial concept through to the pre-production prototype. This is immensely helpful.”

BIOSYN

When one considers that dairy products from Northern Ireland are exported throughout the world to countries as far apart as Japan and Jamaica, Mauritius and Malaysia, lengthy product shelf life becomes crucial to the retention of these important international markets. In 1990 BIOSYN, a member of the QUBIS Limited group, entered the SMART competition with a proposal to develop a diagnostic assay kit aimed at better detection of spoiling bacteria in milk products. The final product should increase the shelf-life of many dairy products.

The Directors and management of BIOSYN are fully supportive of the initiative which is of great potential benefit to the company and to the regional economy. Managing Director, Mr Conor McGurk said, "The SMART award and IRTU assistance have been particularly valuable in enabling the company, with its limited resources, to exploit this technology and bring innovative products to the market place. Benefits should be on a significant scale through improved product quality in cheeses, spreads and yoghurts. Early application of new technology by the quality conscious dairy industry here would undoubtedly enhance its reputation considerably."



Mr Conor McGurk
Managing Director
BIOSYN

“The SMART award and IRTU assistance have been particularly valuable...”

“IRTU is supporting a project that will move our company to the frontiers of telecommunications software...”

Mr Paul McWilliams OBE
Chairman
BIS Information Systems

BIS INFORMATION SYSTEMS

BIS Information Systems based in Antrim Technology Park is part of Nynex, one of the world's largest corporations. It is currently investigating the feasibility of a media broadband service that would apply throughout many countries and industries. The software would allow images, voice, data, text and video to be transported in an integrated way between geographically dispersed sites. IRTU judged that the project was highly innovative and should give the company a premier position globally in this technology.

Mr Paul McWilliams, Chairman, said, “IRTU is supporting a project that will move our company to the frontiers of telecommunications software development. Success should lead to a highly competitive product and create new jobs in the process”.





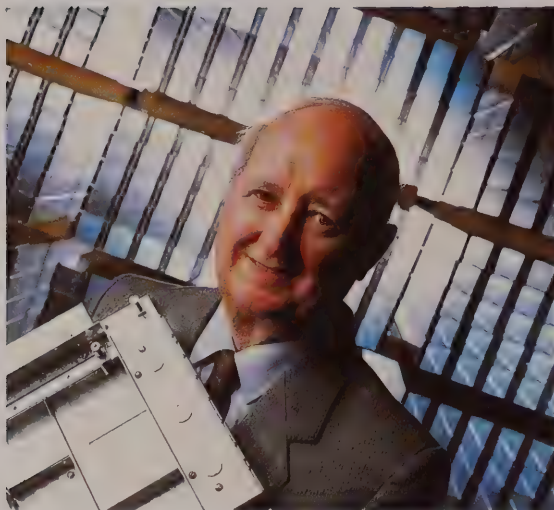
Mr Ronnie Blackwood
Director
BKS Surveys

“IRTU is helping to ensure that Northern Ireland remains ahead of the game as far as field survey work is concerned.”

BKS SURVEYS

When continuing to use existing production techniques might result in a loss of competitive edge, the time is right to consider product or process development. BKS Surveys who conduct aerial and ground surveys did just that. They capture their data via aerial photography as well as through field work. The system for merging the information gathered by these methods was thought to be too cumbersome and prone to discrepancy. Using assistance from the IRTU Product and Process Development Programme they are devising a system whereby the surveyor can complete his field work using a laptop computer into which the aerial information has already been entered. The result should be an on-site merger of the field work with the computerised aerial photograph. This would allow errors in the measurements to be sorted out at the site, rather than discovered later.

Mr Ronnie Blackwood, BKS Director, said that he was pleased that IRTU was prepared to support this innovative new development. He said, “As far as I know this is the first time that this software has been used for digital mapping in the field. IRTU is helping to ensure that Northern Ireland remains ahead of the game as far as field survey work is concerned.”



Mr James Cairns
*Chairman
Castlereagh Sheet Metal*

CASTLEREAGH SHEET METAL

Castlereagh Sheet Metal manufactures a number of ranges of cable trunking. These have been a major commercial success for the company which has made full use of the IRTU Product and Process Development Programme to develop techniques to reduce manufacturing costs. One project, to design and develop a new range of fittings using modern manufacturing techniques, has proved to be particularly successful.

Mr James Cairns, Chairman, said of the project, "The fact that our fittings are now fabricated from a punched sheet of metal, rather than having to be assembled from several components and spot welded, has been of enormous benefit to our competitive position. Thanks to IRTU assistance, sales of the new products have rocketed."

“Thanks to IRTU
assistance, sales of the new
products have rocketed.”

“It is just as important for farmers as it is for other businesses to be aware of the changing demands of the consumer.”

Mr David Dobbin
General Manager
Dalgety Agriculture



DALGETY AGRICULTURE

There has been a steady decline in butter consumption throughout the last decade with growing customer preference for polyunsaturated products. Dalgety Agriculture with support from IRTU's Product and Process Development Programme has commenced work on the diet of dairy cows so that, if possible, milk containing more unsaturated fatty acids can be produced. If successful, the project should allow the development of a range of cattle feeds that enable farmers to produce milk for this growing niche market.

Mr David Dobbin, General Manager for Dalgety in Northern Ireland, said, “It is just as important for farmers as it is for other businesses to be aware of the changing demands of the consumer. If this Northern Ireland-based research results in the dairy farmer being able, through feeding, to meet those demands, then Dalgety Agriculture will have achieved an important breakthrough.”

“The grant support from IRTU was of great assistance and contributed significantly to the success of this innovative range of hairdryers.”

Mr John Rainey
*Managing Director
Denroy Plastics*

DENROY PLASTICS

The design and supply of a range of new hairdryers for a major retail outlet is a challenging task, even for a company like Denroy Plastics with experience of the manufacture of domestic electrical appliances. The retailer demanded very rigid specifications in respect of noise levels, energy efficiency and control versatility. Assistance of over £40,000 was provided by the IRTU's Product and Process Development Programme, resulting in the project being successfully completed, with all models of hairdryer now in full scale production and on sale throughout the UK.

Mr John Rainey, Managing Director, said, “We had to work closely with designers, toolmakers and material suppliers to ensure that the final product was to a high standard. The grant support from IRTU was of great assistance and contributed significantly to the success of this innovative range of hairdryers.”



DIGITAL ENGINEERING

Digital Engineering, Mallusk, are involved in a project, which received a SMART award in 1991 to develop a Terminal Adaptor/Modem allowing better communication with the new Integrated Services Digital Network (ISDN). Since ISDN is still relatively new in the UK, many businesses are reluctant to go to the considerable expense of installing it. This adaptor represents a means of allowing the user to communicate with either the new ISDN or the more common analogue system. Its advantage lies in the fact that one product can communicate with the current network of modems, while providing an upgrade path for the new, faster ISDN services.

Managing Director, Mr Aubrey Sayers, said, "This new product will take advantage of the new ISDN telecommunications services. It could, with ISDN, for example allow the information on a sheet of A4 to be transmitted in a remarkable 2 seconds. Compare that with the analogue system requiring 15 to 20 seconds for the same amount of information. I am delighted that, with the help of IRTU, the concept has received the backing of the SMART adjudicants."



Mr Aubrey Sayers
*Managing Director
Digital Engineering*

“I am delighted that,
with the help of IRTU, the
concept has received the
backing of the SMART
adjudicants.”

“The IRTU assisted project involves industrially relevant research and highlights the expertise in the application of computer technology that exists in Northern Ireland.”

DU PONT

IRTU is supporting a joint project between Du Pont (UK) Limited, Londonderry, and Queen's University Belfast to improve plant process control at the company's Maydown plant. A computerised control system will be designed using the latest developments in neural network modelling. The result should be to improve safety and yield, and hence profitability. Such improvements would support the Maydown plant in its ongoing efforts to attract further investment.

Mr John McCormick, a manufacturing systems development manager at Maydown, is enthusiastic about the project. He said, “The IRTU assisted project involves industrially relevant research and highlights the expertise in the application of computer technology that exists in Northern Ireland.”

Mr John McCormick
Du Pont UK Limited





Dr John King
Managing Director
Galen Limited

GALEN

When a company moves from simply packaging tablets that have been manufactured elsewhere to the development and manufacture of its own products, it is a big step. With help from the IRTU Product and Process Development Programme, Galen have taken that step, and made a huge success of it. Production of 3 varieties of tablet has now switched from plants in the Republic of Ireland and England to Galen's new factory at Portadown, contributing significantly to Galen's profitability.

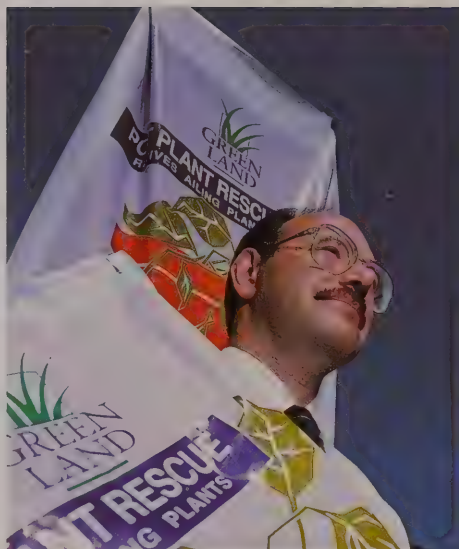
Dr John King, Galen's Managing Director, said, "We are delighted with the success of this project. The support of an IRTU scheme has ensured that work previously carried out at greater cost elsewhere can now be done in Northern Ireland."

“The support of an IRTU scheme has ensured that work previously carried out at greater cost elsewhere can now be done in Northern Ireland.”

GREEN LAND SYSTEMS

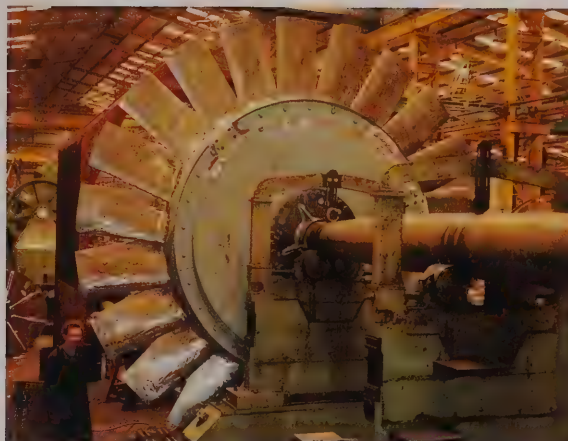
Green Land Systems applied for a SMART award to develop a compost dryer capable of producing 6,000 tonnes of horticultural produce per year from farm waste. The machine had to be capable of carrying out the composting process in a short space of time and then drying the compost using the heat generated during composting. The idea turned out to be a great success and since the end of the SMART awards, the company has blended the dried compost with other materials to form a range of horticultural products with a distinctly “green” image.

Dr Les Gornall, Managing Director, said, “In two years, we have taken an idea, patented it, and after the help of IRTU and SMART, we have manufactured the revolutionary composter/dryer and had successful sales of a range of new environmentally friendly products.”



Dr Les Gornall
*Managing Director
Green Land Systems Limited*

“...after the help of IRTU and SMART, we have manufactured the revolutionary composter/dryer and had successful sales...”



“...with the support of IRTU, we were able to take on and meet the challenge.”

Mr Bill Stafford
Managing Director
Howden Sirocco

HOWDEN SIROCCO

Howden Sirocco has been very active in the design and supply of gas reheaters and booster fans which have been installed on flue gas de-sulphurisation plants in Europe and Scandinavia. More recently the UK has also embarked on a major programme to reduce sulphur dioxide emissions on two of its large coal-fired power stations, but with operational specifications which were much more onerous than previously encountered.

The Managing Director of Howden Sirocco, Mr Bill Stafford, said, “Howden Sirocco received an order for booster fans, each weighing 50 tonnes and powered by 6500 kilo Watt motors, to be designed to a very stringent specification. We knew that a successful design would result in a product able to compete in the world market and, with the support of IRTU, we were able to take on and meet the challenge.”



Mr Brian Baird
Northern Ireland Manager
ICL

ICL

Leading edge technology is being used to meet the requirements of the Northern Ireland Housing Executive for a modern, flexible housing management and repairs system. ICL is developing one of the most sophisticated relational databases in Europe for this purpose. The project, involving state of the art relational technology in a multi-processing UNIX environment and ICL's database accelerator, involves the University of Ulster and Kainos Software. It has been supported by IRTU's Science and Technology Programme.

Mr Brian Baird, ICL Northern Ireland Manager, said, "By establishing close contacts with our Future Systems Research Division in Bracknell, the University and Kainos are ensuring that Northern Ireland is able to expand the skills available to it in this rapidly growing area of software technology. We were delighted that IRTU were able to support this pioneering work, which will be of great benefit to large relational database users the world over."

“We were delighted that IRTU were able to support this pioneering work, which will be of great benefit to large relational database users...”

“There is no doubt in my mind that product and process development has given us a competitive edge... I look forward to continuing the close relationship with IRTU.”

Dr Fred Hogg
Company Director
Macrete Ireland

MACRETE IRELAND

Advanced products and processes are a crucial feature of Macrete Ireland's business success. They result from over 10 years involvement in product and process development. For example, the computerisation of box culvert design reducing design time from 2 days to half an hour, and the development of the moulding process to allow an almost infinite variety of shapes, have led to big savings in production costs. These enable the company to compete in markets outside Ireland despite the extra transport costs involved.

The Company Director, Dr Fred Hogg, said, “There is no doubt in my mind that product and process development has given us a competitive edge through product quality, uniqueness, range and costing. This development work will continue and I look forward to continuing the close relationship with IRTU.”



“I am pleased that the support from IRTU made it possible for us to take on the challenge...”

Mr Ivan McCabrey
*Chairman
Mivan Marine*

MIVAN MARINE

An Antrim-based Northern Ireland company, Mivan Marine, landed a major contract to design and manufacture a series of speciality catering carts for the Euro-Disney development, each reflecting a different Disney theme. Development of the carts was a challenge. The very highest standards are expected by the Disney Corporation, and the French safety, electrical and hygiene laws must be met. The project, costing over £250,000, was supported by the IRTU Product and Process Development Scheme.

Mr Ivan McCabrey, Chairman of the Mivan Group, said, “A considerable degree of technical innovation was required throughout the project. I am pleased that the support from IRTU made it possible for us to take on the challenge, because we have now acquired the expertise necessary to extend our involvement in this kind of niche market.”



MOY PARK

What makes chicken taste so good?

Answering that question allows a company like Moy Park to improve continuously the quality of its products by laying greater emphasis in the production process on those factors that increase flavour. Flavour is formed by reactions which occur during cooking between various key constituents of the meat. These in turn are affected by the environment in which the chickens are reared. Moy Park, one of Northern Ireland's leading food companies, got together with the Queen's University, Belfast to investigate the subject. Supported by the IRTU Science and Technology Programme, the chickens will be reared in Moy Park's Experimental House and flavour assessed in the Sensory Evaluation Unit of the Department of Food and Agricultural Chemistry at Queen's.

Mr Trefor Campbell, Managing Director of Moy Park, said, "The Northern Ireland poultry industry has the potential to become a major force in Europe, due to the disease-free status of its chickens and the innovation of its products and processes. This joint project, supported by IRTU, should result in an added value premium in the marketplace, further enhancing the reputation of our poultry industry."



Mr Trefor Campbell
Managing Director
Moy Park

“This joint project, supported by IRTU, should result in an added value premium in the marketplace...”

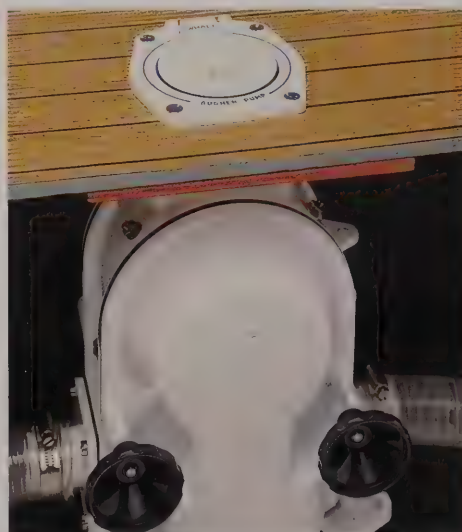
“Without it our company could not survive in the competitive business environment of today.”

**MUNSTER SIMMS
ENGINEERING**

Munster Simms Engineering made a strategic decision to ensure a steady flow of new product developments to maintain market leadership and brand loyalty. Research identified demand for a new Gusher pump for boats with substantially greater output, improved valves, greater flexibility of fitting and at a lower price than the existing model. Munster Simms successfully approached IRTU for support for its development, and the result is that the new pump is now in production and selling well.

Mr Nigel Eves, Managing Director, Sales, with overall responsibility for the company's product development programme, said, “I would endorse all that IRTU are saying about the importance of innovation and product development. Without it our company could not survive in the competitive business environment of today. We hope to continue to work closely with IRTU in the future.”

Mr Nigel Eves
*Managing Director, Sales
Munster Simms
Engineering Limited*





Mr Iain Kennedy
Plant Manager
Northern Telecom

NORTHERN TELECOM

The telephone changed very little after its invention in 1876 until 1989 when the international telecommunications industry was set alight by the development of low cost portable phones or Personal Communications Networks (PCN). Northern Telecom, Newtownabbey, has taken the lead role in PCN development and with assistance from IRTU's Product and Process Development Programme has developed a range of highly innovative products.

Mr Iain Kennedy, Plant Manager, said, "The company has a history of pioneering new ideas in telecommunications. In developing advanced systems for a new generation of communication networks, we will work closely with IRTU to ensure we remain world leaders."

“In developing advanced systems for a new generation of communication networks, we will work closely with IRTU to ensure we remain world leaders.”

“We now have a wide range of industrial members, who help to direct the research and who will benefit from the results of the research.”

Mr Jim Swindall
*Commercial Director
Questor*

QUESTOR

The Queen's University Environmental Science and Technology Research Centre (Questor) was the first industry/university co-operative research centre in the environment area outside the USA. It is concerned with industrially relevant basic research, with a proportion of its funding channelled through IRTU from the International Fund for Ireland. Industry helps fund the Centre and decides on its programme of work. Research is aimed mainly at reducing the environmental impact of industrial wastes. Amongst work underway is a project to discover how chlorinated hydrocarbon wastes are degraded by micro-organisms. Its results could lead to increased use of microbes in water treatment. Another project in this area considers the role for peat and lignite in removing toxic heavy metals from water or effluent. Findings so far indicate that this process can remove hazardous metals at a fraction of the cost of rival systems. In addition it should be possible to recover and recycle the metals.

Mr Jim Swindall, Questor Commercial Director, is delighted by the progress of the Centre since it was opened in 1989. “We now have a wide range of industrial members, who help to direct the research and who will benefit from the results of the research. These include companies from the Republic of Ireland, Northern Ireland and elsewhere in the UK. Together they provide about one third of our funding.”





Dr Peter Fitzgerald
*Managing Director
Randox Laboratories*

RANDOX LABORATORIES

Randox Laboratories is a family-run company formed in 1982 and one of the few independent manufacturers in the world of clinical chemistry kits. It has developed more than 150 highly innovative diagnostic kits. It is working closely with IRTU on a number of projects, one of which should allow a screening test for low levels of certain drugs in blood or urine. A fast screening system for chemicals such as Beta agonists would be a step forward in detecting the drugs in animals.

Dr Peter Fitzgerald, Randox Managing Director, said, "Our strategy is to develop innovative, useful products with technological leads over other companies. The support we receive from IRTU ensures that as a small company we have the ability to continue this strategy in the development of drug tests and in other ways."

“The support we receive from IRTU ensures that as a small company we have the ability to continue this strategy in the development of drug tests...”

“This IRTU assisted research project will provide us with the technology to make technically superior products

SHORT BROTHERS

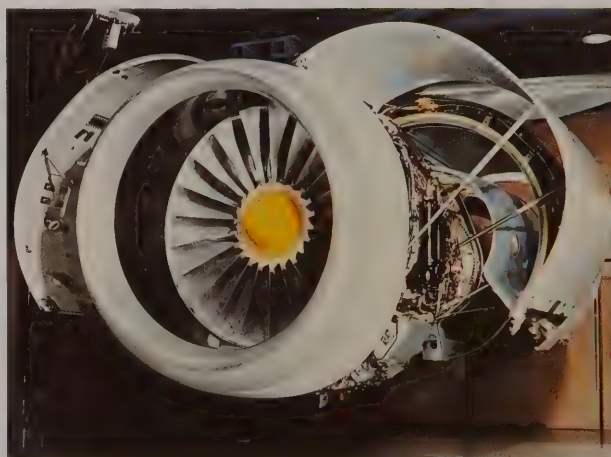
As leaders in the use of advanced materials, Short Brothers plc recognised the need to maintain their competitive position and sought support for a project to develop the technology for the design and manufacture of spatially reinforced composites, which will give major improvements in product performance. In collaboration with the University of Ulster, Shorts now have a contract with IRTU's Science and Technology Programme for the project. It is aimed at developing the fibre placement and resin transfer moulding technology necessary to produce the composites. The successful completion of the project will allow Shorts' to expand their market share and increase the amount of advanced composite material used in the build of an aircraft.

Shorts Project Manager, Mr Stephen Addis, is very pleased with the progress of the project so far. He said, “In the aerospace business, technology and innovation are the key to maintaining the company's competitive position. This IRTU assisted research project will provide us with the technology to make technically superior products at lower cost more quickly to market. It will also give us the flexibility to meet the changing needs of the aerospace industry.”

at lower cost
more quickly
to market.”

Mr Stephen Addis

*Project Manager
Short Brothers*



SYSTEMS SOLUTIONS

Systems Solutions is a high technology company involved in industrial electronic design and manufacture. Its main product area is automatic test equipment. To ensure continued company growth it decided to diversify and identified a market requirement for a low cost, lightweight, automatically guided vehicle. The company considered that the cost of a long-term research project to develop such a vehicle would be a severe drain on resources. Through IRTU, application was made for a SMART award. It proved successful and Stage 1 allowed the principles underlying the project to be proven. Stage 2 is taking the vehicle to prototype. The company hopes it can be launched on to the market as soon as possible.

Mr Alan Watts, Technical Director, said, "With the help of IRTU and the SMART award we have proved that at a practical level it is possible to produce a working prototype of an automatically guided vehicle. Now we are close to having a product which should allow our company to diversify and grow in the 1990s."



Mr Alan Watts
*Technical Director
Systems Solutions*

“With the help
of IRTU and
the SMART award we have
proved that at a practical level
it is possible to produce a
working prototype of an
automatically guided vehicle.”

“He that will not
apply new remedies
must expect new
evils, for time is the
greatest innovator.”

Francis Bacon

INNOVATING
TO WIN

*The key to
competitive
success.*

An Aide Memoire
for busy managers



The Key to Competitive Success

All businesses want to compete, successfully and profitably.

Competition is getting tougher. Innovation is regarded as the key to competitive success.

So busy managers want to know three things about innovation:

What it is

Why they need it

How they go about it

The “*How*” varies in detail from business to business. But regardless of the size or nature of the business it includes a common approach and core areas of activity.

This “Aide-Memoire” for busy managers summarises - succinctly - the “*What*”, “*Why*” and “*How*” of successful innovation.

INFORMATION CENTRE

11 JUN 1993 3629

Wellcome Centre for Medical Science

Innovation: What it is

There are almost as many definitions as there are management theories.

Basically it is the successful creation and commercialisation of new products, services or ways of doing business.

And - crucially - it involves *all* the activities necessary to achieve these objectives.

It is a total, continuous and integrated process. It includes technological development and design, marketing and sales, training and new management information systems.

It is more than science and more than technology; it requires what Akio Morita (Chairman of the Sony Corporation) calls the "three creativities":

Creativity in technology;

Creativity in product planning;

Creativity in marketing.

Innovation: Why it is necessary

Henry Ford summed it up:

*“everything is in flux and was meant to be...
life flows; it is not a location but a journey.”*

Local, national, EC and world markets are increasingly competitive.

New markets, and market challenges, are quickly emerging in, and from, Eastern Europe, the “Third World”, Asia, South America.

Within the EC, peripheral areas such as Northern Ireland must compete aggressively to meet the single market challenge.

Product life cycles are shortening.

Consumer preferences are changing.

New products and technologies are proliferating.

Investment in innovation is vital to business growth.

Maximising profits and dividends is not, of itself, the key to growth.

Without innovation there are no new products to replace the old and both profitability and growth are threatened.

Future margins depend on current R&D spending - “cuts” can improve short term profitability but damage future prosperity.

Innovation: How it is done

By *accepting* the certainty and continuity of change.

By *adopting* a flexible and positive attitude to the challenge.

By *addressing* 10 core areas in an integrated manner:

- COMPANY STRATEGY
- CORPORATE COMMITMENT
- OPEN COMMUNICATIONS
- FLEXIBLE ORGANISATION
- CUSTOMER FOCUS
- FINANCIAL FORESIGHT
- SUPPLIER SENSITIVITY
- COMPETITIVE AWARENESS
- TECHNOLOGY AUDIT
- PRODUCT DEVELOPMENT

Innovation: Ten core areas

COMPANY STRATEGY

- Have customer oriented mission statement and strategy.
- Consult upon it.
- Communicate it clearly.
- Set agreed targets.
- Monitor, evaluate and revise in the light of performance and continuous change.

CORPORATE COMMITMENT

- Give, and show, top level leadership.
- Use it to encourage collective commitment.
- Train and re-train to maximise skills and motivation.
- Advance trained young engineers and technologists through the corporate structure.
- Encourage team, group and personal ownership and achievement.
- Tailor financial rewards to such achievement.

OPEN COMMUNICATIONS

- Consult, inform, brief and operate an open door policy.
- Communicate upwards, downwards and sideways.
- Follow up agreed actions.
- Provide, and encourage, feedback.

FLEXIBLE ORGANISATION

Make certain the organisation serves the business - not vice versa.

Go for flexibility, adaptability and rapid accommodation to change.

Regard each phase of the business as an equal link in the single chain of innovation eg. link applied research, development, design, production engineering, manufacturing, sales and service.

Track, record and report to top management on product development projects and market performance.

CUSTOMER FOCUS

The customer is the company.

Contact, consult and visit customers.

Identify their needs and - crucially - their satisfaction levels.

Encourage frequent feedback.

Recognise your customer's market as part of your market and be alert and adaptable to changes in it.

FINANCIAL FORESIGHT

Recognise that future growth does not necessarily follow from big profits.

Inform investors fully on company mission, strategy and commitment to innovation.

Though difficult, attempt to assess the full costs of an investment in innovation and the financial returns.

Avoid non specific generalisation on the benefits of innovation.

Go for specifics, such as the amount to be spent; the estimated percentage of sales from new products by a clear target date; the anticipated income bearing in mind the inevitable decline in the sales of current product or services.

Balance openly the need for both sufficient investment to ensure future competitiveness and the provision of an acceptable short term return for investors.

SUPPLIERS SENSITIVITY

Recognise the advantages of building long term, mutually beneficial relationships.

Consider the relative advantages and disadvantages in both single and multi-sourcing.

Be alert to new ideas and business opportunities in dealings with suppliers.

Recognise the possibility of collaborative development projects with suppliers.

COMPETITOR AWARENESS

Know, and never underestimate, your competitor - however small.

Remember Goliath (and David).

Recognise that competition can come from unexpected as well as established sources.

Regularly review your relative performance and products.

Analyse your competitors products and learn from all applicable sources.

TECHNOLOGY AUDIT

Recognise the “life cycle” in even the most enduring products.

Analyse the likely progress of your products through sales growth, maturity and into obsolescence.

Use technology audits to (i) evaluate the market shelf-life and vulnerability of your products and (ii) identify new technologies and business opportunities.

Maintain close links with universities and research institutions to monitor emerging new technologies.

Consider the advantages of collaborative projects with universities, research institutions and suppliers to develop new technologies.

Use facilities offered by IRTU's Technology Audit scheme to increase your competitiveness.

PRODUCT DEVELOPMENT

Recognise that your new products, or those of others, can make your existing products obsolete.

Evaluate relative product performance continuously.

Aim to derive a high percentage of turnover from new products generated in a short and recent timescale.

Aim for continued business effectiveness through the generation of profitable new products, and not merely increased efficiency through the improvement of traditional products.



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“Great inventions
are never, and great
discoveries are seldom
the work of any one
mind. Every great
invention is really an
aggregation of minor
inventions, or the final
step of a progression.
It is not a creation but
a growth - as truly so
as that of the trees in
the forest.”



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